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The Official Journal of the Rocks and Minerals Association

Chips from the Quarry

PRICING MINERALS

On page 346 of the November, 1939, issue of ROCKS AND MINERALS appeared a short item which read as follows: "We believe that mineral specimens as a whole are priced too low. They should command at least five times the prices asked for them."

One of our good friends in the State of Delaware has requested an explanation of our statement. He believes that if prices were raised it would enormously reduce the number of mineral collectors and consequently the number of dealers.

We believe that one of the chief stumbling blocks to the advancement of mineral collecting is the *stagnation* of mineral prices. A specimen purchased for $1.00, twenty-five years ago is worth only $1.00 today and oftentimes is sold for even less. This is due to the fact that mineral localities are not given the value that is due them.

A specimen from any old locality that may have gone out of existance many years ago should be worth *more* than an equally good specimen from a modern locality. And the price for such a specimen should be advanced, if only slightly, from year to year. For example, any of those fine chondrodites from Tilly Foster, N. Y., margarite from Chester, Mass., or brucite from Woods chrome mine of Texas, Penn., which twenty-five or more years ago were purchased for $1.00 each should now be worth $2.00 or $3.00 each, and the value should continue to advance steadily until the specimens either become damaged or begin to deteriorate. If this policy would be adopted by collectors and dealers it would be to the great advantage of mineral collecting.

Let us digress a minute by comparing mineral collecting with the world's most popular hobby—stamp collecting. Why is stamp collecting so popular that it can attract devotees by the millions, with dealers carrying enormous stocks located in every large city of the world (sometimes a dozen or more in one city), and with so many stamp magazines issued, some even weekly?

We cannot speak for all stamp collectors but if the opinions of the large number we have approached is a true cross-section of the hobby, than stamp collecting is a financial investment with the value of the stamps advancing from year to year. Consequently, no matter what new stamps may be issued nor how beautiful their coloring or designs, they do not lower the value of older, and less attractive varieties. A stamp purchased for 5 cents may within a few years be worth $20.00 or even more, a tremendous increase in value. Is it any wonder, therefore, that stamp collecting has such a wide, universal appeal, that kings, presidents and millionaires are among its followers. Specimens of stamp issues disappear during the years, and the rarer they become, the more they are desired, and the more the collectors will pay.

Is not the same thing true of mineral specimens and should not the same rule hold? The best specimens from a mine or quarry usually come from the surface workings. As depth increases, the specimens become of less and less value and may disappear entirely; or mine or

(Continued on page 131)

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Whole No. 105

THE STORY OF THE GREAT NOTCH QUARRY

By WALTER P. SACHS

An air of desolation has settled upon sheer walls of weathered trap rock. The pervading stillness of an abandoned quarry is unbroken save for echoing rifle shots when occasional target shooters practise. Underfoot is matted, lumpy swamp grass in moist spots; bushy growths give way to bare soil and a scattering of rock chunks nearer the walls —altogether bearing semblance to a slowly healing, mighty wound.

So, as this is written appears the once-celebrated mineral locality at Great Notch, New Jersey: the old Francisco Bros. trap rock quarry.

This is the story of that quarry. The story of the days when thundering blasts would have smothered today's sounds of rifle shooting; when the noises from the engine house and the rock crushers and the loading of trucks all contributed to a cacophony which means energy and life to a quarry.

This is an account, too, of the mineral collectors at that quarry. A procession of collectors passes in review, many of them ghostly figures of the past who would appear in fancy to pause on their way and silently begin hammering in the shadows of today's abandonment—hoping for some mineral crumbs of yesteryear.

And, finally, this is a description of the mineral species found at that quarry.

The History

Records of the early days at the Francisco Bros. quarry are scanty[1]. The two brothers, original owners and operators of the trap rock quarry, were J. H. Francisco and S. G. Francisco. Both have died.

It appears that these two brothers began operations which led to the production of rock in Great Notch about ten years before the turn of the century. The quarry which became noted for its bounty of zeolites and associated minerals—the one widely known as the Francisco Bros. quarry—was opened in 1905. It was the third of a succession of quarries opened by the brothers, the first of such operations having been initiated in 1890 in another part of their mother's farm one-third of a mile away.

But good quality stone quickly petered out at the first quarry and the same thing occurred later in a second quarry started nearby on the Francisco property. These first two quarries, which had produced a few desirable mineralogical specimens, were abandoned when the third, more famous Great Notch quarry was opened.

There are now several quarries in the Great Notch area and there were several in operation before the last blast was set off in the Francisco Bros. quarry in 1922. None of the other nearby sources of trap rock, however, has produced mineral specimens comparable with those found at the Francisco quarry in such abundance and fine quality.

In the seventeen-year span of exploitation, many thousands of tons of trap rock were taken from this quarry and sold mainly for use in road construction. Probably the peak years of production were between 1910 and 1920. In 1922, after the consolidation of several local quarrying companies, it was found that

work at the Francisco quarry no longer would be profitable. This, it is understood, was the determining factor in the cessation of operations although a supplementary reason often heard is that the quarry was abandoned because of objections made to the blasting by residents in the neighborhood.

Employing more than two dozen men, the Francisco Bros. equipment included rock crushers, a tram line used in loading, a railroad siding, engine house and all the other usual quarry adjuncts. In its prime, the quarry was the noisy hive of industry that is always associated with active quarrying.

The Locality

Broadly speaking, the Francisco Bros. quarry is in the northern part of the northeast-southwest ridge of Triassic trap rocks comprising New Jersey's First Watchung Mountain[2]. In the same general situation also are found the famous localities of Paterson, West Paterson and Upper Montclair. The Watchung ridges interrupt a broad lowland with gently rolling hills and attain an altitude of approximately 900 feet above sea level.

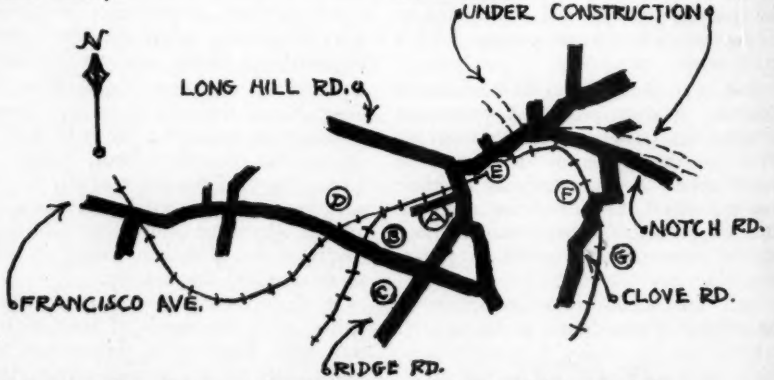
Specifically, the Francisco Bros. quarry is about four miles southwest of Paterson and a few minutes' walk from the Erie Railroad station at Great Notch, in Passaic County.

Fifty to sixty feet in depth at the steepest walls, the quarry assumed a roughly rectangular shape with a jog in the southwest corner. The choicer, unweathered zeolites and other minerals usually began to appear after the rock had been blasted and removed to a depth of about fifteen feet.

Sketchily, the areas of greatest mineralization in the quarry were the southern and western walls, ranging in depth from fifteen to forty feet. Mineralization was more limited in the northern and eastern ends.

Yielding the cleaner and more attractive specimens were roughly spheroidal structures in the rock. These curved segments were usually harder than the other igneous rock, but when they contained minerals in cavities, the specimens were virtually always of outstanding quality. The quarry seemed to exhibit mineralization with regularity and specimens were almost constantly obtainable and plentiful after each blast.

Given a choice of any of the walls to work for minerals, most collectors with experience at the Francisco Bros. quarry unhesitatingly would have selected the southwestern corner. For it was this small area, not much more than twenty feet deep, which produced the choicest datolites, heulandites, stilbites and natrolites.



(A) Francisco Bros. Quarry as described in this text.
(B) Old Francisco Bros. Quarry, first of the three; approximate location.
(C) Second Francisco Bros. Quarry.
(D) Tunnel for waterworks.
(E) Great Notch station of the Erie Railroad, Greenwood Lake Branch.
(F) Great Notch Corporation Quarry.
(G) Consolidated Stone and Sand Company Quarry.

Natrolite seemed to occur in a nearly vertical vein in the corner through which filtered a spring that supplied drinking water to the quarry workers and quenched the thirst of many an enthusiastic collector. The southern wall was notable for its prehnites in particular, the western wall for apophyllites, stilbites and heulandites, while in the eastern wall were found the nodules of agate.

The Collectors

Although collectors were discovering choice specimens at the Francisco Bros. quarry within five years after work began there, the peak years for fine specimens were between 1912 and 1920. In these eight years, collectors of greater or lesser note from near and far visited the locality and the quarry attained world-wide mineralogical renown.

Names that rank high in the roster of mineralogists are to be mentioned as well as the more humble collectors. We may picture them thronging the old quarry: the addict whose wife thought minerals an unbearable nuisance compelling him surreptitiously to conceal his specimens in small bottles under his bed; the one who had a great fondness for his "zeolites"; the enthusiast with the aesthetic eye who collected purely for beauty of form and color and the mineralogical scientist constantly seeking something new or informative.

Outings were conducted from time to time to the locality by the New York Mineralogical Club, the Philadelphia Mineralogical Society and the Newark Mineralogical Society.

As is to be expected, most of the collectors who became habitués of the quarry were residents of New Jersey. In the early days of the quarrying operations, one could expect to find Dr. W. S. Disbrow and his father, both of Newark, whose suites have become part of the Newark Museum's collection. Also among the Newarkers who frequented the locality were William H. Broadwell, A. C. Bates, John Holzman, Louis Reamer, George F. Black and many others. Ernest H. Wilson of Caldwell, N. J., was an ardent collector at Great Notch, as was C. Richard Siday, formerly of Caldwell. Paul Walther of Elizabeth, N. J., and H. F. Obert and his son, then of Hawthorne, N. J., often visited the quarry as did John A. Grenzig and George O. Simmons, both of Brooklyn. James G. Manchester of New York City was also an occasional visitor at the locality.

Hermann Papke of Hoboken, an indefatigable worker, supplied many Great Notch specimens to the American Museum of Natural History in New York and to the F. A. Canfield collection, then at Dover, N. J., but now a part of the United States National Museum mineral assemblage.

Anecdotes by the dozen could be retold of the collecting at the Francisco Bros. quarry. There was the one concerning a never-to-be-forgotten welcome given at least one collector on his first visit to the locality: a group of a half-dozen playful Maltese kittens tumbling out of the engine house at his approach and every one of them so near the color of the finely crushed trap rock as to suggest, startlingly, the development of protective coloration within a single generation.

Tales of stilbites so red that one collector thought they were streaming blood and that his chisel must have cut his hand; vivid descriptions of hard-earned prizes, won only after hours of effort with crow-bar and hammer and chisel—these all cause a definite yearning on the part of present-day collectors. There was the story of a mild Christmas Day sometime before the 1920s that was enriched by Papke's discovery of a huge pocket of apophyllites in the western wall, near the engine house. Many fine specimens were recovered from his pocket, comprising a superb Yuletide gift.

And there is the depiction of a magnificient group of gmelinites which never left the quarry — as a group. They studded a dish-like cavity about fifteen inches in diameter, but a difficulty was that the cavity was atop a two-ton boulder of the hardest type of trap rock in the quarry. A dish fit for a king—but all that could be accomplished with it was to chip out small gmelinite morsels!

The Minerals

A description of the minerals produced at Great Notch cannot stress any that are unique to the locality; it cannot point to a great number of species there found. But when a comparatively small quarry yields some thirty to forty species, it may be noteworthy. And when certain of these species are found in rare perfection of crystallization and with infrequently encountered coloring, it may be all the more remarkable. The specimens taken from the locality, moreover, were consistently clean, due to an unusual rarity of chlorite or hematite staining.

The greater part of the descriptions which follow are the result of examination of specimens in the writer's collection. These were collected for the most part in person by Ernest H. Wilson of Caldwell, N. J. Other references in the descriptive mineralogy are to the volume by Manchester[3] and to an article by Papke[4].

If any one discovery or specimen from the Francisco Bros. quarry were to be singled out for special mention, it should be the small greenockite crystal on prehnite, collected by C. Richard Siday sometime before 1920 on the south wall of the quarry. It marked the first occurrence on record of this mineral at the locality.

This rare cadmium sulphide is infrequently enough found even as an earthy coating so the finding of the tiny, brilliant crystal hardly larger than 2 mm. in diameter, cradled in a nest of prehnite, was exceptional. The prehnite matrix is of a yellowish tinge, due perhaps to the associated cadmium.

The occurrence is analogous to one noted by Greg and Lettsom[5] who say: "This beautiful and rare species was found * * * at Bishoptown, near Paisley, in Renfrewshire (Scotland) and has not been since met with there. It occurred usually in small but very perfect and brilliant crystals * * * on mammillated prehnite."

Another "first" at Great Notch is a specimen showing an aggregate of small, dull, white crystals of barite, reported by Wilson[6] as the initial and only recorded occurrence there of the barium sulphate.

The several species found at the Francisco Bros. quarry were as follows:

Albite—In curved lamellar structure of cream color. Occasionally in small tabular crystals of the same color. Occurred sparingly.

Analcite — In small trapezohedrons, colorless or pinkish, sometimes with datolite and gmelinite. Very sparingly.

Apophyllite — In single crystals or groups associated with various other minerals. The crystals, up to 3 or 4 cm. in diameter, do not have the transparency of those from Paterson localities and are characterized by the minuteness of the corner truncations. Fairly abundantly.

Aragonite — In aggregates of long, whitish crystals. Sparingly.

Babingtonite—In small, complex crystal aggregates, typical of those found in the Jersey zeolite localities. Very sparingly.

Barite—In aggregates of small, dull, white crystals, directly on trap rock. Only one specimen noted. Cf. above.

Calcite—In fine, sharp "dog-tooth" crystals, sometimes darkened by inclusions. Also fairly common in crystals nearly egg-shaped, although these were usually shattered by blasts. One interesting occurrence was in small, white crystals resembling rice kernels which could have been removed from a huge pocket by the shovelful.

Chabazite—In small rhombohedrons, nearly colorless or light brown. Rarely comparable with those found at West Paterson, though fairly abundant in crystals of very small size.

Chalcopyrite—In sphenoidal crystals, sometimes emplanted on quartz crystals. Sparingly.

Chrysocolla—Reported by Manchester.

Datolite—In pale green crystals with etched faces. Splendid crystallizations, often with but slight attachment to a matrix, occurred up to 4 cm. in length. Abundantly.

Diabantite—Reported.

Epidesmine—In small crystals, but unmistakably of the crystal form which dis-

tinguishes that species from stilbite. Sparingly.

Epidote — Reported by Manchester. Some of the original babingtonite was mistaken for epidote.

Gmelinite — In exceptional, flesh-red crystallizations. One grouping of delicately colored rhombohedrons, about 11 cm. by 6 cm., is one of the finest examples of this mineral observed. Abundantly.

Goethite—In a specimen described as "referable to goethite," the habit seen is minute, acicular crystals of a blackish color forming radiated groups on quartz and calcite. Sparingly.

Greenockite—Very sparingly as a coating. One brilliant crystal as mentioned above.

Gypsum—Reported by Manchester.

Hematite — In small groups of thin, tabular crystals forming rounded aggregations, sometimes on quartz and calcite. Sparingly.

Heulandite—In what has been termed "canoe shaped" or curved habit and of a wide range of delicately lustrous colors'. Very abundantly.

Laumontite — In glistening stellated crystallizations when first taken out, but on exposure becoming opaque and pulverulent. Abundantly.

Natrolite—In acicular crystals, often radiating. Beautiful snowy white, finely acicular aggregations, occasionally pinkish, were found. Abundantly.

Opal, var. common opal—Reported by Manchester.

Pectolite—In rounded aggregations of closely packed acicular crystals, often attaining great size, in thaumasite. Beautifully radiated, with silky luster. Abundantly. Sometimes with manganese present as *manganpectolite*. *Stevensite,* an alteration product of pectolite, is reported by Manchester.

Prehnite—In globular groups of crystals often of fine green tints. In early days, in attractive, contrastingly colored specimens with quartz. Abundantly.

Pyrite—Reported by Manchester.

Quartz, var. agate—In nodules in the trap rock which made attractive polished specimens. Papke says the agates were sometimes found "in a highly decomposed state, the different layers almost falling apart." Of frequent occurrence.

Quartz, var. amethyst—In usually pale colored crystals, "frequently drusy," according to Papke. Rather sparingly.

Quartz, var. chalcedony—In nodules in the rock. Fairly abundantly.

Quartz, var. jasper—Reported by Manchester.

Quartz, var. milky—Reported by Manchester.

Quartz, var. rock crystal—In crystals of varied sizes, commonly lining cavities. The predominant mineral at this quarry, according to both Manchester and Papke. It occurred in clear, shining crystals, from minute druses to 1 or possibly 2 cm. in diameter.

Quartz, var. smoky—Reported by Manchester.

Scolecite—Reported by Manchester.

Stilbite—In sheaf-like aggregates, commonly light hair-brown in tint, and of excellent quality. Occasionally the sheaves attained great size. When associated with datolite, the stilbite was usually salmon-pink or white. Sometimes blood-red. Very abundantly.

Stilpnomelane—Reported by Manchester.

Thaumasite—In large masses, from a chalky to a porcelain-like texture. These were remarkable occurrences of this mineral which, for a time, was very abundant. One mass was reported to be 3 or 4 feet in diameter.

Thomsonite—Reported by Manchester.

REFERENCES

1 Major part of the historical data was supplied the author by Harry H. Francisco of Great Notch, a relative of the quarry's founders.

2 Geology of the area from *The Crystal Cavities of the New Jersey Zeolite Region* by W. T. Schaller—GEOLOGICAL SURVEY BULLETIN 832 (Washington, 1932).

3 *The Minerals of New York City and Its Environs* by James G. Manchester (New York, 1931).

4 *A Visit to the Mineral Localities at Paterson and Great Notch, N. J. by* Hermann Papke—THE MINERAL COLLECTOR, Vol. XV, No. 8; October, 1908.

5 *Manual of the Mineralogy of Great Britain and Ireland* by Robert P. Greg and William G. Lettsom (London, 1858).

6 *Barite from Great Notch, N. J.* by Ernest H. Wilson—THE AMERICAN MINERALOGIST, Vol. 4, No. 1; January, 1919.

7 Cf., *Heulandite: Most Colorful Zeolite?* by Walter P. Sachs—ROCKS AND MINERALS, Vol. 14, No. 11; November, 1939.

LEXINGTON, VIRGINIA, AND THE SHENANDOAH VALLEY

By HERBERT B. POMERANTZ

One of the most interesting and enlightening geologic tours can be taken in the Appalachian Valley and Ridge province. Not only can one observe some of the most interesting geomorphological structures of the east, but many unique mineral specimens have found their way into the earth's structure along this route.

I began my tour along the well known Harper's Ferry water gap of West Virginia. This certainly was a fitting entrance for a trip through the valley that lay ahead. Following Route 340 through the long outcroppings of metamorphosed green phyllites and dirty quartzites, I was soon thrust into a sea of limestone whose sunken and hollowed caverns spoke reverently of their great beauty.

In Winchester, the apple blossom city, limestone masses of blue-gray lined the old Civil War battle grounds and thoroughfares. Even the hogbacks of the Massanuttens, visible just outside and south of the city, reflected an historic struggle; not so much a struggle between men but one in the earth itself, a struggle for peace and equilibrium.

Following Route 11 south, ugly shales tried to break up the surrounding limestone. However, they were not successful for in their efforts they had become limy as well. Just a mile south of the town of Strasburg I noticed a large outcrop of Chambersberg limestone in which numerous examples of ripple marks, some bryozoans, and fossils of dalmanella could be found. The exposed slickensides extended over a large area at this point.

A little further along the road limestone quarrying was taking place in a large open pit. The limestone was rather dark and filled with numerous calcite veins. Small calcite crystals (common types) were in abundance.

A little further along the road, limesame road (just over a stream where the road had cut through a small hill of stone,) I found three small veins of Bentonite (an altered volcanic ash.) These veins were hemmed in between layers of Martinsburg shale that made up the bulk of the exposure. This "clay" is indeed rare in the eastern part of this country.

It was only a short distance from here to the Mosheim limestone region (and Beekmantown dolomites) where the

Hogbacks in the Massanutten Mountains between Winchester and Strasburg, Va.

great natural caverns are found. The Endless, Massanutten, Virginia, and Shenandoah caves are all along the route, to say nothing of the many others that lie only a few miles off the main highway. Little can be added here to the voluminous writings on these spectacular phenomena of nature. The chemical and physical production of stalactite and stalagmite temples of this region have few rivals in the world in intricacy and splendor.

A big surprise awaits those who stop off at Lexington, Virginia. Riding east out of this city, along Route 60 for one mile, I visited a small limestone quarry known as Charlie Barger's Quarry. The stone in this region had a uniformly dark gray color streaked here and there with gash veins of calcite. As I stood there watching the operations one of the men came over to me and showed me a broken piece of iron pyrite. This as a rule would not be unusual for pyrite often occurs in limestone. However, when I noticed the strange striae on the mineral I investigated further. It was not long before I unearthed some of the most unique pyrite crystals I had ever seen. The crystals were fully from one half to one inch in size, perfect in every face. The striations that intrigued me, I found out, were due to an oscillatory combination producing a tetragonal trisoctahedron or trapezohedron. On some crystals evidence of the typical pyrite cube and parts of the pyritohedron intensified the crystal's struggle. Dr. Whitlock, of the American Museum of Natural History, confirmed the rarity of my find. My regret is that I was not able to leave him a better specimen than I did.

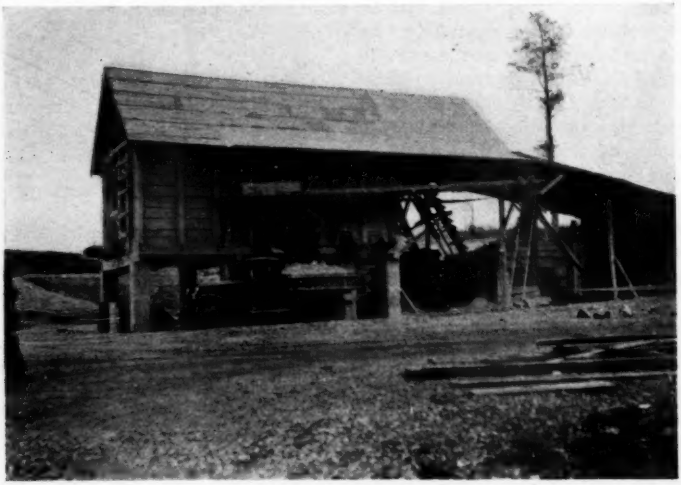
A visit to this quarry would cetainly reward anyone interested in securing these unusual crystal formations. The workers of the quarry claim that they find these crystals quite often.

At once my trip was a success yet I continued on in order to visit the famous Clifton Forge region and Natural Bridge. Motoring, this time, west on Route 60 to a place one and one quarter miles from Lexington I discovered a striking example of a fault. It was exposed on the roadside at a point where the Athens shale and Holstein limestone met. Directly across the road from the fault one could see several small sink holes.

Calcite gash veins in the limestone. Charlie Barger Quarry, Lexington, Va.

Proceding west toward North Mountain I came into the Clinton and Clinch sandstone region. The red soil was quite a change from what I had just visited. Along the ascent and top of North Mountain I stopped occasionally to observe the new formation more closely. Many specimens of mammillary limonite, clay galls, and sandstone concretions were easily uncovered. A little ways further I passed a ghost town that formerly was inhabited by people who worked the iron deposits of the region. I am quite sure that the mines in this region would have been quit interesting had I the time to stop.

My interest next was drawn to an interesting syncline on the side of a mountain where its structure was laid bare. This I soon found out was hardly as impresssive as the great Iron Gate on the other side of Clifton Forge. Following,



Crusher at the Charlie Barger Quarry, Lexington, Va.

then, the road to Fincastle, it was not long before I was confronted with the Iron Gate. It is a tremendous arch of sandstone and one of this country's best exposed examples of an anticline. It was exposed through the action of the Jackson River which was flowing through its gap.

I remained here but a short time and then proceded to the well known Natural Bridge of Virginia. Here I terminated my trip. This wonder, well known to Washington and Jefferson, like the caverns has been well analyzed by many geologists. Space does not permit me to discuss its structure here.

Only on few occasions does one have the opportunity of observing such unusual evidence of structural geology as well as making worth while mineralogical finds. For a varied and educational trip I urge the geologist into the Shenandoah Valley of Virginia.

FLUORESCENT DIAMONDS IN MUSEUM EXHIBIT

A number of small, colorless diamond crystals from Brazil and South Africa, are exhibited in the fluorescent cabinet at the American Museum of Natural History, New York City. Under the ultra-violet light, some of the diamonds fluoresce blue, the others green.

Dr. H. P. Whitlock, Curator of Gems and Minerals at the Museum, says that about one diamond out of every sixty fluoresces.

NOTES ON AMETHYST IN VIRGINIA

ARTHUR BEVAN, State Geologist

Numerous varieties of quartz have been found in Virginia. Most of them occur in the Blue Ridge and Piedmont regions, occupying about half of the area of the State, where the rocks are chiefly igneous and metamorphic. Pegmatite dikes containing quartz and veins of quartz rather commonly invade these crystalline rocks.

Among the varieties of quartz reported from Virginia are amethyst, blue quartz, colorless quartz, or rock crystal, milky quartz, and smoky quartz. Some of the quartz contains interesting inclusions. Good to fine specimens of the different kinds of quartz are now and then obtained. Quartz masses in certain pegmatites are reported to weigh as much as 100 pounds. At the other extreme, tiny perfect doubly terminated quartz crystals have been found in some localities.

One of the most interesting and somewhat uncommon types of quartz in Virginia is amethyst. The place and date of its discovery in the State are unknown, but specimens, some of gem grade, have long been collected.

Occurrences of amethyst have been reported from Albemarle, Amelia, Amherst,, Campbell, Charlotte, Nelson and Prince Edward counties. No doubt the mineral occurs elsewhere in Piedmont Virginia. The famous Rutherford mine near Amelia Court House, among its diversity of rare and unusual minerals, has yielded amethyst, some of which has been of gem grade. (Pegau; Va. Geol. Survey Bull. 33, "Pegmatite Deposits of Virginia," 1932.) In 1935, an amethyst-bearing quartz lens was discovered near Rice, Prince Edward County. Though small, some of the crystals were very fine. Good specimens have been reported near Brookneal in Campbell County and from localities west and south of Charlotte in Charlotte County.

Dr. T. L. Watson (Va. Geol. Survey Bull. 3A, "Geology of the Titanium and Apatite Deposits of Virginia," 1913) describes the occurrence of amethyst in Nelson County as follows:

"Some of the veins contain quartz crystals which weather out and may be picked up on the surface. In several places the quartz crystals are violet in color, and on the farm of J. S. Saunders, 3.25 miles west of Claypool, many beautiful amethysts of gem grade have been obtained. About half an acre has been worked over by trenching to a depth of from 4 to 6 feet. The amethyst is found in residual red clay cut by small broken veins or stringers of white quartz striking in various directions. Occasionally pieces of feldspar more or less kaolinized are also found. The amethyst occurs in small pockets of variable size usually closely associated with the quartz stringers, hence it is generally customary in mining to follow the veinlets or stringers. Amethyst picked up on the surface, which has been exposed to sunlight for some time, is usually faded and of no value. The product from this mine is controlled at present by the American Pearl and Gem Company.

"Many amethyst crystals have been picked up on the surface of the Stratton farm a mile southeast of Massie's Mill, and at a point about half a mile northeast of Fancy Hill, but at neither place has any prospecting been done."

Much blue quartz is also mentioned as occurring in the general area. A thin section, magnified 375 diameters, is illustrated in that report.

New Haven Mineral Club

The April meeting of the Club will be held on Monday, the 8th, at 8:00 p.m. in Room 218, 19 Congress Street. New Haven, Conn. The guest speaker will be O. Ivan Lee who will give an illustrated talk on mineral collecting in western North Carolina.

The first field trip of the year will be to Strickland's Quarry, Portland, Conn., on Sun., April 21st.

GEODES

By ERNEST J. PALMER

Have you ever found a geode? Probably, if you have lived or collected in a part of the country where they occur and where they are sometimes abundant. But many mineralogists in the eastern states have seen them only in collections, or if they are fortunate enough to own a few specimens, they have most likely been acquired by purchase or exchange with other collectors; for geodes are seldom found in regions of igneous or metamorphic rocks and the formations in which they occur are somewhat local. Collecting geodes in a region where they are abundant will afford a thrill to any enthusiastic mineralogist, as every specimen is a sort of surprise box when broken open and many of them exhibit crystals of various minerals of great beauty and scientific interest.

The name geode, as the dictionary will tell you, comes from two Greek words meaning earth-like, because of the generally round or gobular form of these formations. But all geodes are not round and all round stones are not geodes. The term as used by mineralogists is restricted to certain forms of concretions, usually hollow and lined on the inside with crystals or concentric layers of some mineral deposited by infiltration. The smooth round stones often found on beaches or about glacial moraines are sometimes mistaken by the inexperienced for geodes, although they have nothing in common with them except in shape, and they are only fragments of hard rocks that have been worn smooth and round by attrition with other rock material through the action of the waves or of moving ice or torrential streams. If they are broken open, which is usually not an easy process, they will prove to be only solid masses of diorite, granite, quartzite or some other hard rock. Most geodes are approximately spherical, but many are flattened or irregular in shape; they vary in size from that of a small marble to giants two feet or more in diameter.

Geodes are found in many parts of the world, usually in sedimentary rocks, such as shale, sandy or ochrous clay, soft sandstone or impure limestone. Under certain conditions various minerals may be found in geode form, but chalcedony or some variety of silica is by far the commonest material in the outer shell. Sometimes several different minerals may be found in combination in the crystallized interior.

Wonderful amethyst-lined geodes, some of them with outer layers of banded agate, are found in parts of Brazil and Uruguay, and may be seen in the large museums or in private collections. Although these are beyond the reach of most collectors, others of much beauty and interest are to be found in different parts of the United States. They have been found in the Niagara limestone of western New York and in other sections where that formation comes to the surface, as well as in many places in the western and Rocky Mountain states. Probably the best known locality is in the region about Keokuk, Iowa; and almost every museum and large collection in the world has specimens from that part of the country. The geodes of this region are found at certain levels in the Keokuk limestone of the Mississippian series, that is exposed in bluffs of the Mississippi River and its tributaries near Keokuk and at many places in Iowa, Illinois, Missouri and Indiana. The limestone was formed of the remains of corals and the shells of crinoids, molluscs and other marine animals that lived in the Carboniferous seas, and beautifully preserved fossils are also found in it at some places. It is extensively quarried for building stone and other commercial uses, and the quarries often afford excellent places for collecting.

The Keokuk limestone occurs typically in thick horizontal beds that are sometimes separated by impure layers with a considerable proportion of chert in nodules or lenses or of softer limestone mixed

with ochrous clay and porous chert, and it is in these layers that the geodes are embedded. Where the limestone has been carried away in solution or has been removed by erosion, the geodes as well as the chert, being harder and more resistant, have been left free and may be found along the base of the bluffs or in the beds of ravines or streams. These are the best places for collecting, although an abundance of good specimens may sometimes be found about the quarries or may be dug out of the face of the soft ledge with pick or hammer.

The geodes of this region are all composed of chalcedony on the outside which is usually rough, dingy and unpromising in appearance. It is only when they are broken open that the beauty of the crystallined interior is revealed, if it is a choice specimen, for many of them may prove to be solid or unattractive. The great majority of specimens in which there is a cavity are lined with quartz either in the form of brilliant crystals or mammillary chalcedony of a pale bluish tint and of china-like lustre. Usually only the terminal facets or points of the crystals are exposed, but these are arranged in irregular groups, knobs or ridges that reflect that light and form a little fairy grotto that must be seen to be appreciated.

Other minerals that have been found in these geodes are calcite, aragonite, galena, sphalerite, gypsum, barite, ankerite, magnetite, chalcopyrite, pyrite and limonite pseudomorph after pyrite. Sharp pointed calcite crystals are sometimes deposited on the quartz and occasionally the calcite has filled the entire cavity. Bright cubes of pyrite or galena, sphenoids of chalcopyrite or characteristic crystals of the other minerals are also found on the quartz or the chalcedony in some of the geodes. In some cases oxidation has altered the pyrite to limonite or through a similar process smithsonite may have partially replaced the sphalerite. If the geode had not been completely sealed or had been fractured, the interior may be dull and stained by iron oxide or by the corrodine effect of air and water. Quartz crystals in some geodes are partially covered by a layer of the amorphous chalcedony, showing that it is a later deposit.

So much collecting has been done in the immediate vicinity of Keokuk that geodes are not as abundant there as they were formerly. In the south edge of the town a small creek flows into the Mississippi from the west. A high wooded limestone bluff bounds its valley for some miles on the east side, and some quarrying has been done along it near the Missouri Pacific railway station and farther west. Geodes were formerly abundant at some points along this bluff, and I have never failed to find some specimens when I have had time to look for them in the quarry ledges or in the ravines further up the bluff. But if one has the time and is bent on real collecting, it will pay to go further afield across the river on the Illinois side or south into Missouri.

As I have visited the Keokuk region a number of times and have also picked up a few geodes for my collection in other parts of the country, a brief account and description of them may be of interest to other collectors.

When I was a small boy living near Warrensburg, Missouri, I remember finding curious hollow stones of a dark red color in soft sandstone or weathered from it. Some of them rattled when shaken, and when broken open they were found to be partially filled with red or yellow clay or ochre. These limonite geodes are generally irregular in shape, often flattened and elongated or more or less egg-shaped, but sometimes they are nearly spherical. The walls are thin, from a quarter to three-quarters of an inch thick in most specimens, with concentric layers that shell off on the outside, and they are easily broken. They are found also at some localities in eastern Kansas, where I have seen specimens in farmer's yards, some of which would hold a gallon or more of water. As limonite is not a crystalline mineral, the layer lining the interior is nearly smooth or slightly mammillary, and while these unusual geodes are interesting they are of no great beauty.

Chalcedony nodules are abundant in some localities near Arkansas City, Kansas, not far from the boundary of Oklahoma. Once while collecting there I came upon several geodes, and they are perhaps not uncommon if carefully looked for. The specimens were quite thin-shelled and were lined with rough, rather dingy chalcedony.

Some years ago while on a botanical collecting trip in western Texas, I stopped in the village of Barksdale, in Edwards County, and one day made a trip up into one of the canyons that are common at the heads of small streams in the limestone hills. A young man in the neighborhood acted as guide and we drove in a buggy for some miles over a rough road that followed the bed of a creek until we came to the canyon where the high bluffs closed in on all sides. Fine springs were issuing from some of the ledges that were covered with ferns and a luxuriant growth of other plants. It was a beautiful spot, and the trees and plant life proved most interesting. But I had noticed also at one point along the creek some round stones that looked suspiciously like geodes, some of which were loose in the creek bed and others partially imbedded in the soft limestone bank. On our return I stopped to investigate and picked up several of them which I shipped home for future examination. When broken open they proved to be thick-walled geodes lined with large crystals of pale blue celestite with a little superimposed calcite.

Besides collecting several times at Keokuk, I have come upon geodes, usually by accident, at other localities in the general region, although my time has generally been so limited that I did not have a chance to explore them thoroughly. On one occasion while collecting plants in Lewis County, northeastern Missouri, I left my travelling companion with the car on the highway and made an excursion through the woods and across a little stream, where half a mile or so away I came out into an abandoned, eroded field. The gullies were filled with geodes of all sizes, and I believe that a truck load of them could have been picked up. Returning to the car with a sample or two, I interested the driver and we both went back and brought out what we could carry in a burlap bag. On account of the distance, the rough going and the weight of the plunder, the number was not very large. Some of them when broken open proved to be solid or nearly so, but others were quite good, although quartz crystals and chalcedony were the only minerals found in them. Some years later when passing through the same section I tried to find the place again but without success. On a more recent trip we drove down on the east side of the river from a point opposite Burlington, Iowa, to the bridge at Keokuk. Beyond the old Mormon town of Nauvoo we followed a newly constructed road below the bluffs and close to the river bank. A few miles above the bridge we stopped at some quarries to look for geodes. We soon found them in the waste material thrown out below the workings, but they were not particularly abundant nor exceptional in quality. Time was pressing and we could not look further, so I picked up a few to give to friends and went on to Keokuk. One small specimen kept for my own collection has a stringer or bridge of crystals across the opening, which by good luck was not broken in opening the geode.

To make good cabinet specimens it is desirable to break the geodes into approximate halves, and this requires some skill and experience. Even with the greatest care an unlucky blow may shatter it into several fragments. The amount of force that can be used depends upon the thickness of the walls, and this can be estimated roughly by the weight of the specimen and it should be tested cautiously. The specimen should be held in the hand with a heavy glove, or a block of wood may be used as an anvil, while it is tapped about the center with the sharp edge of a geologist's or a brick mason's hammer. The force of the blows can be gradually increased and sometimes a shallow groove can be worked about the equator. If the specimen is a particularly hard or heavy one

it may be necessary to lay it on the ground and strike it with a stone hammer, taking chances on the result.

The question is often asked, what caused the geodes or how did they originate? It cannot be answered very definitely, for various theories have been advanced and authorities who have studied the subject do not always agree. It is probable too that all geodes were not formed in the same way, and those found in various regions and formations may have originated quite differently. As most of them are found in sedimentary formations it is evident that a cavity was formed in some way in the mud, ooze, or other material that later hardened into the matrix. This cavity became lined with a crust of chalcedony from the silica in solution in the sea water. At a later stage before the cavity had been filled, the formation was elevated above sea level and other mineral matter in solution percolated through the shell and was deposited in concentric layers and crystals on the inner surface. It has been suggested by one authority that bubbles of carbon dioxide were formed in the limestone while it was being redeposited after solution by percolating water from the overlying Coal Measures, and that the geodes were formed in the cavities left by these bubbles. Another theory supposes that nodules of pure calcium collected about some nucleus in the sea mud, and a shell of silica was formed about these, and that later under different conditions the calcite was removed by solution leaving the cavity with its siliceous lining to be gradually filled or partially filled by infiltration. The theory has also been advanced by Dana and others that the geodes have replaced fossil sponges that have been hollowd out by solution. It is probable that some geodes were formed in this way, as certain species of sponges secrete silica from the sea water to form their skeletons or microscopic spicules. But there is little evidence that the geodes of the Keokuk limestone had such an origin, since no fossil sponges have been found in the formation.

But whatever may have been their origin, geodes make most attractive specimens, and they must be seen to be appreciated. No illustration or photograph can give any idea of their beauty. For the lover of minerals they have an appeal both to his imagination and his aesthetic sense, when he has the privilege of finding and opening one of these little jewel boxes of Nature, the master craftsman.

EDITOR'S NOTE:—In the Feb., 1940, issue of ROCKS AND MINERALS, we printed a very fine article, "Geodes of the Keokuk Area of Iowa," by Frank L. Fleener. Though Mr. Palmer's article (received in 1939) also covers the Keokuk area, in a limited manner, we did not want to change it in any way as it is a general article on geodes.

NEW YORK STATE GEOLOGICAL ASSOCIATION

16TH ANNUAL MEETING—APRIL 26 AND 27, 1940 AT CATSKILL, N. Y.

The citizens of Catskill, who are sponsoring this big event through the Catskill Chamber of Commerce, Board of Trustees, Rotary Club, and Firemen's Association, cordially invite all those interested in geology to attend this meeting in a region unsurpassed for its geology and noted for its scenery and hospitality.

An excellent program is being arranged covering visits to nearby localities where interesting geological phenomena of all description will be observed.

Through the courtesy of Dr. M. S. Hammond, Superintendent of the Catskill Schools, the Catskill High School will be the headquarters for the meeting.

If you are planning to attend, please register at your earliest with R. W. Jones, Secretary, New York State Geological Association, Catskill High School, Catskill, N. Y.

COLLECTING AT ALSTEAD, N. H.

By RUDOLF C. B. BARTSCH

Persistant and intensive collecting at the Golding Keene Mine at Alstead, N. H., by some members of the Boston Mineral Club during the past few months, has resulted in the finding of a number of very interesting specimens, among which, I believe, are a few that are new for this locality.

Rose quartz of color and quality equal to any found in New England was secured in a new prospecting hole. The range of color in this vein of quartz gave a very beautiful effect. Starting at the left of the opening, the quartz was white, then increasing shades of pink until a deep rose red was reached from which point it paled off into a lighter shade. At the right side of the opening, the quartz was jet black, then brown becoming lighter as it approached the rosy colored material. The color was distinctly amethystine where the smoky and pink colors combined.

Beryl in very fine terminated crystals of varying sizes and colors were secured on some of the older dumps. Many of these beryls have large sections of gem quality and excellent color, which could yield cut stones 1½ to 5 carats for the aquamarines, and 1½ carats for the deep golden beryls. Some of the crystals show double terminations. A large number show another interesting form, a double growth. The first growth has a diameter of ½ to 1 inch which is usually half-buried in the second or larger growth which has a diameter of 1 to 2 inches. The vertical axis of the two growths is very nearly in line. Of those that were broken, the first growth in all cases showed fine terminations. The larger growth built on the smaller "pegs" was able in many cases to form double terminations.

Autunite was first found here between leaves of a muscovite agglomeration. More recently we have found fine specimens in microcline and in masses of altered granular garnet.

Uraninite, Gummite and Uranophane are, I believe, new minerals for this locality. The Gummite is more brownish-yellow than that found at Grafton, N. H., due perhaps to a Limonite stain which occurs on all the Microcline in which the Gummite is found. Some interesting specimens were secured which give unusual effects, a very perfect "eye," under the ultra violet rays. The centers are Gummite and Uranophane which are surrounded by a most perfect circle of altered Microcline thoroughly impregnated with Autunite. The radiation is evenly distributed in all directions from the center. These "balls" are 1¼ to 1¾ inches in diameter and when broken across the middle give a very realistic green eye with a dark center under the ultra violet rays.

Montmorillonite of a deep salmon-pink color and in compact masses was found in similar "balls" about 1½ inches in diameter. I believe this also is a new mineral for this locality.

Garnets of unusual size were also found, some weighing over 5 lbs., that had many fine faces even though they were coarse. Most of these large Garnets were found in partially altered Microcline. These Garnets contained sections of gem quality and a very deep red color. Some fine quality gemmy garnets of a deep red color were found in granular quartz from which cut stones of 2 carats each were secured.

Be a mineralogical missionary. Induce a friend or two to become interested in minerals and start collections of them.

CALIFORNIA MINERAL PRODUCTION FOR 1939

The total value of the mineral production of California for the year 1939, just closed, is conservatively estimated by the Statistical Section of the Division of Mines, Department of Natural Resources, under the direction of Walter W. Bradley, State Mineralogist, to have been $356,095,000. This is partly detailed in the tabulation below, but as there are more than 55 mineral substances on California's commercial list, figures on the most important items only are available at this early date. The production report forms are being mailed to the operators in all mineral lines, and the detailed and completed report will be compiled and published later.

The estimated total of $356,095,000 is a decrease of approximately $24,350,000 from the 1938 total value. The principal increases in values over those of the previous year were shown by the metals gold, copper, quicksilver, and silver; the industrial group and saline group. Important minerals to register decreased values were petroleum, natural gas, miscellaneous stone, cement, and brick.

Petroleum output showed a decrease in both amount and value from that of the previous year of about 10 percent. The estimated quantity was 224,376,000 barrels, a decrease of about 25,000,000 barrels. There was little or no change in the prices paid to producers by the refineries. There was a decrease of about 2 percent from 1938 in the amount and value of natural gas utilized.

Receipts of bullion at the mint and smelters showed an increased output of gold of some 95,000 fine ozs. Thus 1939 had the highest annual gold value since 1856, and the largest yield in fine ounces since 1862, also the largest annual lode output in both amount and value in the history of mining in the State. The silver and quicksilver yield each had a total value over the million-dollar mark. The output of silver, copper, and quicksilver each showed an increase over that of 1938.

Of the structural group, these materials as a whole showed a decreased production and value from that of the previous year. Although building permits in 51 principal cities of the State increased approximately 8.6 percent, large public construction was less than in 1938 as many larger projects were completed in that year. Conditions indicate the miscellaneous industrial and saline groups should show increases in their total value over 1938.

The estimated values and quantities for 1939 are as follows:

$ 49,210,000	(1,406,000 fine ozs.) gold.
1,773,000	(2,613,000 fine ozs.) silver.
875,000	(8,410,000 lbs.) copper.
43,000	(860,000 lbs.) lead.
1,140,000	(11,500 flasks) quicksilver.
970,000	Other metals including chromium, iron ore, platinum, tungsten ore, zinc, and others.
231,109,000	(224,376,000 bbls.) petroleum.
22,015,000	(328,582,000 M. cu. ft.) natural gas.
14,960,000	(10,681,000 bbls.) cement.
10,500,000	Crushed rock, sand and gravel.
2,500,000	Brick and hollow building tile.
1,200,000	Other structural materials, including bituminous rock, granite, magnesite, marble, sandstone, slate, etc.
5,300,000	Miscellaneous industrial materials.
14,500,000	Salines, including borates, potash, iodine, salt, soda, and others.
$356,095,000	TOTAL

The Chiselers

A regular meeting of the Chiselers was held on Friday, February 9, 1940, at 8:00 p.m., at the home of its sponsor, Miss Evelyn Waite, Crestwood, N. Y. The meeting was almost called off at the last minute due to a fire near Aqueduct Shaft No. 22 on the outskirts of the village. Fortunately for the Chiselers the fire was of a minor nature.

An interesting talk on gems by the sponsor in which a large cake of ice was used to demonstrate them was a unique feature. The spacious meeting room was darkened and by means of a flashlight shining through colored cellophane that was held close to the ice, the ice did resemble the colors to a marked degree of those of amethyst, emerald, ruby, topaz, etc. Colored movies, a fluorescent mineral display and refreshments were other attractive features that went over big with those present in the number of 25.

The Chiselers, all young girls, meet on the first Saturday afternoon in the month. The February meeting had to be changed due to a play as many Chiselers were in the cast.

ANOTHER YEAR AT TILLY FOSTER

By JOHN N. TRAINER

Four minerals new to Tilly Foster turned up in the year 1939 and "turned up" correctly describes the process because two were found in 1936 and one was found many years ago. Only one was actually found at the mine in 1939. They are:

Scapolite—variety dipyre

Serpentine pseudomorph after scapolite

Serpertine pseudomorph after talc

Pyrite pseudomorph after pyrrhotite

The scapolite and serpentine after scapolite are both in one specimen which was found by the writer in 1936 and laid aside for later identification. It is four by three by two inches in size. The scapolite is a two inch vein in the pseudomorph, massive, grayish white, resembling feldspar, with a fibrous appearance on certain cleavage surfaces and with occasional square prisms. The index of 1.551 to 1.552 indicates a composition of Ma_{75}—Me_{25} or between marialite and meionite in the scapolite group. This makes it the variety dipyre according to Winchell's scale although Dana says dipyre is a synonym for mizzonite.

Scapolite has been found at the Mahopac Mine, a few miles west of Tilly Foster, where the minerals are much the same as those found at Tilly Foster.

Pyrite pseudomorph after Pyrrhotite
Actual size
Tilly Foster, N. Y.

The fresh scapolite in the specimen runs off into serpentine after scapolite at both ends and the pseudomorphic material is dark gray-green with yellowish patches. Remnants of the scapolite cleavage are visible in the serpentine. The identification of pseudomorphs which is so often difficult was easy in this case.

The serpentine pseudomorph after talc was found on the dumps by the writer last year and identified by comparison with talc specimens from Tilly Foster.

The pyrite after pyrrhotite was found perhaps fifty years ago and is a good example of "turning up" as the following story reveals: Last Winter, learning that Mr. A. J. Harstad of Helena, Montana, had some minerals from Tilly Foster, I wrote him for further information and in due time he sent for inspection about ten specimens, among them one labeled "pyrite after ripidolite" which looked interesting. I questioned him both as to the locality and the identification and he replied as follows:

"In regard to the 'pyrite after ripidolite' I am as sure as any one can be under the circumstances that it is from Tilly Foster. It came to me from the Braun stock from Brooklyn in a case with a bunch of other T. F. minerals and I do not see how it could be anything but a T. F. mineral. The label checked. The technical error of identification is possible because this specimen was found as far back as fifty years ago and much has been learned about pseudos in the meantime. If it is something unusual, the proper place for it is no doubt in your collection especially as it would be hardly more than a curio to any one else and particularly as it has been more or less of a damnuisance to me for five or six years trying not to lose it. You can keep it with my compliments."

Dr. Pough of the American Museum of Natural History identified it as after pyrrohotite. I do not know whether

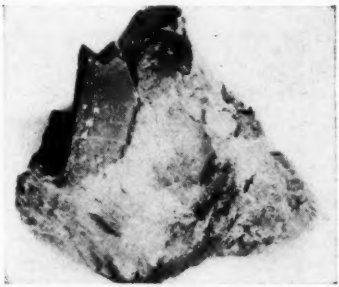
Mr. Braun (who was a dealer and who is now dead) found it originally but for the time being will give him the credit. It is an agglomeration of small pyrite cubes in the form of a six-sided prism with a flat termination, a half inch long and five-sixteenths across. A smaller prism branches from the side of the larger one.

Last Summer, I discovered in material set aside for further study, specimens of stilbite, of calcite after aragonite in small thin rosettes on magnetite ore and of dolomite after chondrodite which I had found two years ago. These minerals were all reported by Dana in 1874. I now have so much material laid aside at home that I can do almost as well by working it over as by going to the mine.

A friend supplied me with a specimen of green apatite, a rare mineral at Tilly Foster. My collector-friends have certainly been generous to me.

I found on the dumps for the first time red banded serpentine reported nearly forty years ago. What a variety of colors there is in the Tilly Foster serpentine—black, gray, white, yellow, red and many shades of green!

The following minerals collected last Summer may not be new to Tilly Foster but they interest me as being the first I have found in these forms:



Serpentine Cast in Dolomite—Half Size
Tilly Foster, N. Y.

CALCITE—thin rosettes up to a half inch in diameter, on dark serpentine; concentric rings of gray and white like an agate.

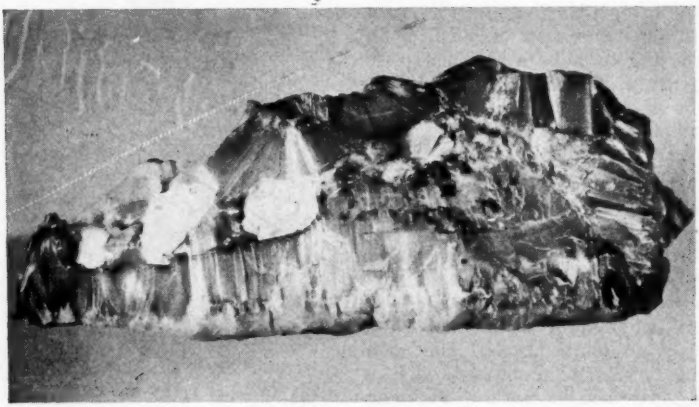
DOLOMITE — curved rhombs on drusy fluorite.

FLUORITE — botryoidal groups of small crystals on serpentine.

MAGNETITE — polysynthetically twinned dodecahedral crystal in a cavity with clinochlore, calcite and hornblende.

PYROXENE VAR. DIOPSIDE— a brown eight-sided prism, half inch by a half inch, with two smaller prisms, in a diopside matrix.

Serpentine pseudomorph after Dolomite. Size 2/3
Tilly Foster, N. Y.



Serpentine pseudomorph after — what? Actual size
Tilly Foster, N. Y.

SERPENTINE — foliated and folded like crumpled paper, grayish green.

TREMOLITE—flat gray green crystals on magnetite spread over an area of three by six inches. Tremolite was first reported massive in 1937; these crystals are the first which I have seen.

I added to my collection last year decidedly better specimens of actinolite (silvery bearded crystals), apophyllite, aragonite, bronzite, chrysotile (two specimens), molybdenite, colloidal serpentine (four specimens, green and nearly white), tourmaline (three specimens); also additional good specimens of actinolite, ankerite, columnar and crystal brucite, chondrodite (a coarse large brown crystal), dolomite, magnetite crystals, blue serpentine, serpentine after periclase (?); and brown, yellow and white serpentine with calcite all in one specimen as a coating on magnetite covering an area three by five inches. In all, I put into the collection about forty specimens during the season and discarded about twenty; thus a locality collection lives and grows.

In the issues of ROCKS AND MINERALS for October, 1938, and February, 1939, were listed all the minerals found up to the latter date at Tilly Foster. Aragonite and phlogopite were listed as new to the locality but further study revealed that they were mentioned as long ago as 1874. Chondrodite after dolomite was also listed as new but Professor Palache, of Harvard University, says it is extremely unlikely which is enough said; it should be de-listed.

The scapolite and the three new pseudomorphs mentioned above bring the total of species to fifty-nine and of pseudomorphs to thirty-two of which I have fifty-one and twenty-five respectively.

There were no collectors at Tilly Foster last year on the days when I was there except when the New Haven Club came over. The members were perhaps disappointed but to me their most interesting find was colloidal serpentine.

The crushing plant was sold last Fall and moved to a quarry near Goshen, New York, which makes it more difficult to find the minerals which were in the cap over the mine. Tilly Foster is now entirely deserted except for the very occasional mineral collector and the birds, wasps and ants.

MINERAL DAY AT THE WORLD'S FAIR
(New York City)

MONDAY, JUNE 17, 1940

Specially Set Apart for you and all Persons Interested in Mineralogy

PLAN TO BE THERE

The first meeting of the National Advisory Committee of the Mineral Day at the World's Fair was held on Wednesday, February 21, 1940, at 3:00 p.m. in the offices of Mr. Joseph D'Agostino, in the RCA Building, Radio City, New York City. The Committee (only seven members present however) discussed the preliminary plans and policies for the event. The meeting adjourned at 4:45 p.m. to meet again at the discretion of the Chairman, Joseph D'Agostino.

The National Advisory Committee consists of:

John G. Baragwanath, American Institute of Mining and Metallurgical Engineers.

Dr. H. C. Dake, Editor MINERALOGIST MAGAZINE

Joseph D'Agostino, Secretary, Plainfield Mineralogical Society

A. L. Eaton, THE DESERT MAGAZINE

M. L. Ehrmann, Mineral dealer

Dr. William F. Foshag, President, Mineralogical Society of America

Samuel Gordon, Academy of Natural Sciences, Philadelphia

Dr. Alfred C. Hawkins, U. S. Dept. of Agriculture

James L. Head, Mining Club

Dr. Walter F. Hunt, Editor THE AMERICAN MINERALOGIST

Dr. Meredith E. Johnson, State Geologist of New Jersey

Dr. Paul Kerr, Secretary, Mineralogical Society of America

Dr. David H. Newland, State Geologist of New York

Dr. H. C. Parmelee, Editor ENGINEERING & MINING JOURNAL

Dr. Frederick H. Pough, American Museum of Natural History, New York City.

M. F. Reed, Northwest Federation of Mineral Societies

C. D. Woodhouse, California Federation of Mineral Societies

T. A. Wright, President, Plainfield Mineralogical Society

James S. Wroth, Mining & Metallurgical Society of America

Peter Zodac, Editor ROCKS AND MINERALS

. . Collectors' Tales . .

By PETER ZODAC

When is Enough Enough!

At one time Wilbur J. Elwell, a wholesale mineral dealer of Danbury, Conn., made a special visit to a working quarry in his state to fill an order for some pegmatite minerals.

Just as he was about to leave, loaded down with many pounds of minerals, a quarryman happened to approach and casually asked him if he had any luck.

"No, it was a poor day," replied Mr. Elwell, meaning that he found nothing of special interest nor any rare mineral.

Just than the quarryman happened to glance into the back of the car and seeing the bagfulls of minerals, exclaimed: "Good grief, do you have to fill your car way up over the running boards before you call it a good day?"

QUEENS MINERAL SOCIETY

The second annual dinner of the Queens Mineral Society was held in the Hudson Room of Hotel Woodstock, 127 W. 43rd St., (Times Square), New York City, on Thursday, February 15, 1940, at 6:30 p.m. A varied and interesting program had been arranged and the 30 members present had a most enjoyable evening.

At each plate was displayed a very attractive little card, folded over so that it stood up, and bearing the words—"Queens Mineral Society, Annual Dinner, February 15, 1940 (and the member's name)." Along the left edge of the card were two colored bands, topaz yellow and amethyst purple, the official colors of the Society. On top of the card, set in a little recess, was a small mineral specimen, bearing a number.

The dinner was officially opened with the singing of *America.* Two or three songs were sung during the dinner.

At the end of the dinner, a social half-hour was spent that was introduced by Mr. Ernest S. Jaros, the Toastmaster, who called upon the Society's President, Mr. Anton Orgonas, to say a few words to the group. Then some member went around with a "grab-bag" and there were many ahs and ohs as the "grabs" were unwrapped and their contents revealed. Following this, Mr. Jaros read off from a card the names of minerals (by number) that were perched on top of the members' cards.

The guest speaker of the evening was Peter Zodac, Editor of ROCKS AND MINERALS whose topic was—"Mineral localities of Putman and Westchester Counties, New York."

Following the talk, Mr. J. C. Boyle of the Children's Museum, Brooklyn, N. Y., spoke briefly on some of his collecting experiences. He was followed by Mr. John A. Grenzig, veteran mineral dealer of Brooklyn, N. Y., who read off a number of amusing conundrums, requesting the members to answer them.

With the singing of one more song, the Second Annual Dinner of the Queens Mineral Society passed into history.

The Queens Mineral Society meets regularly on the 2nd Thursday of the month, at 8:00 p.m., at the home of its President, Mr. Anton Orgonas, 289 Etna St., Brooklyn, N. Y.

During the singing of *America,* some enthusiastic "young" member sang "I love thy rocks and *minerals.*"

The attractive member's cards displayed at each plate were designed by the Society's attractive Secretary, Miss Bernadette Reis.

The guest speaker almost did not show up. Due to the storm, the early train he tried to catch was an hour and a half late in reaching the city.

About half of the members present were girls, young and pretty, too. This speaks well for the future of the Society because if it can attract pretty girls the boys will join also.

Heard at the dinner.—A gold mine is a hole in the ground owned by a liar. Stocks are mine boats propelled by ores.

R. Emmet Doherty, President of the Rocks and Minerals Association who was scheduled to be one of the speakers, failed to show up due to a heavy cold. (P.S.—The cold was in his head and not in his feet).

New York Mineralogical Club

A regular monthly meeting of the Club was held at the American Museum of Natural History, New York, on Wednesday, February 21, 1940, at 8:00 p.m. Mr. James L. Head, Mining Enginner of the Chile Copper Company was the guest speaker whose subject was—"The History and Development of Copper Mining at Chuquicamata, Chile." It was illustrated by motion pictures and specimens.

Chuquicamata, a word believed to have been derived from the Indians, (possibly Chuqui Indians) is a city of 20,000 population of whom 6,431 work in the mines. It is in the Atacama Desert in the northwestern part of Chile (in Antofagasta Province). The city is 150 miles northwest of the city of Antofagasta and 90 miles due east of the coast.

The copper deposits are worked opencut whose pits extend for about two miles and are about 3900 feet wide. Since 1910, about 250,000,,000,000 tons, total material (rock and ore), have been excavated. The deepest drill hole sunk on the deposit reached 1925 feet and it was still in ore. The interesting mineral, atacamite, was found within 98 feet of the surface but now is no longer obtainable.

Seventy members and guests were present at the meeting. H. R. Lee was the presiding officer with Dr. T. H. Pough at the Secretary's desk.

VALUE OF MINERAL PRODUCTS OF THE UNITED STATES, 1937-1938, BY STATES—SUMMARY*

State	1937	1938
Alabama	$ 53,519,000	$ 46,026,000
Alaska	27,928,000	27,664,000
Arizona	96,564,000	60,756,000
Arkansas	25,578,000	29,378,000
California	476,881,000	490,237,000
Colorado	67,339,000	60,403,000
Connecticut	3,690,000	3,060,000
Delaware	397,000	321,000
Dist. of Columbia	523,000	569,000
Florida	13,812,000	12,867,000
Georgia	12,584,000	11,599,000
Idaho	40,633,000	31,738,000
Illinois	133,438,000	127,824,000
Indiana	54,887,000	46,741,000
Iowa	26,941,000	25,171,000
Kansas	154,376,000	129,488,000
Kentucky	127,424,000	106,565,000
Louisiana	182,119,000	172,307,000
Maine	4,129,000	3,549,000
Maryland	10,635,000	9,460,000
Massachusetts	7,813,000	6,666,000
Michigan	119,168,000	81,319,000
Minnesota	152,107,000	51,425,000
Mississippi	4,822,000	5,210,000
Missouri	52,446,000	39,513,000
Montana	82,087,000	48,711,000
Nebraska	4,838,000	4,029,000
Nevada	38,872,000	27,031,000
New Hampshire	1,220,000	1,147,000
New Jersey	31,468,000	24,409,000
New Mexico	72,856,000	63,795,000
New York	77,666,000	73,217,000
North Carolina	11,160,000	14,959,000
North Dakota	2,873,000	2,653,000
Ohio	131,025,000	103,620,000
Oklahoma	367,444,000	272,917,000
Oregon	6,610,000	7,549,000
Pennsylvania	599,817,000	471,394,000
Rhode Island	863,000	912,000
South Carolina	4,022,000	4,364,000
South Dakota	23,473,000	23,583,000
Tennessee	34,894,000	32,229,000
Texas	813,291,000	740,141,000
Utah	105,652,000	59,145,000
Vermont	7,043,000	6,440,000
Virginia	46,019,000	42,191,000
Washington	26,658,000	21,161,000
West Virginia	306,591,000	254,295,000
Wisconsin	15,240,000	10,637,000
Wyoming	41,088,000	37,357,000

* In this table iron ore, not pig iron, is taken as the basis of valuation of iron, and in the case of other metals mine production (recoverable content of metals) is the basis.

By M. B. Clark
Mineral Production and Economic Division
H. Herbert Hughes, Chief Economist
U. S. Bureau of Mines

PRICING MINERALS

(Continued from page 110)

quarry be closed and abandoned never to reopen again. Thus the possibility of securing fine specimens from a locality is then only by purchase, if they are available, and the rarity should have something to do with fixing the price. This should result in greater interest in specimens of old localities and collectors would strive to obtain as many of them as possible knowing that in later years they could be resold at a nice profit. If the prices continue to remain low so that no profit is to be accrued, than mineral collecting will not attract investors and the hobby will remain stagnant as has been the case for many years. There will always be cheap specimens, for 5, 10 and 15 cents each, and collectors will continue to personally gather others at localities so that the hobby will not suffer in any way.

In this great country of ours we know of only one dealer though there may be two or three others, who devotes his entire time to the selling of mineral specimens. The others must have some other means of employment to make a living because—there is no profit in selling minerals at the present low rate asked for them.

We honestly believe it would be far better for a collector to pay $5.00 for a specimen now and twenty-five years later sell it for $15.00 than to pay $1.00 for the same specimen and twenty-five years later sell it for $1.00 or 50 cents. Which of these two would you prefer?

Peter Zodac

PHILADELPHIA MINERALOGIST LOST AT SEA

When the ill-fated *Athenia* was sunk by a mine or torpedo, a few months ago, one of the passengers who went down with her was Miss E. Alva Campbell, of Philadelphia, Penn. Announcement of her death was delayed, pending the hope that she might turn up alive but as month followed month and all efforts in trying to trace her failed, it is now conceded that she must have perished.

A number of passengers who were saved, remembered Miss Campbell and spoke glowingly of her high courage and bravery when disaster struck with sudden fury and how she took charge of a little boy who had lost his mother. Whether this little boy was saved or perished with her may never be known.

Miss Campbell was a science teacher at the Frankford High School, Frankford, Philadelphia, Penn., where she taught science since 1925. Being intensely interested in mineralogy, she was the founder, in 1933, of the Frankford Mineralogical Club, an organization which has had a steady growth ever since.

Miss Campbell, as a young girl, formerly lived in the Kensington section of Philadelphia and was graduated from Girls' High School. She attended the old Philadelphia Normal School, the University of Buffalo where she received a degree in botany, and did special work at the University of Pennsylvania.

DEALER'S YOUNG SON DIES

A Joseph Alessi, well-known mineral dealer of Lombard, Illinois, and a member of the Rocks and Minerals Association, suffered a very severe blow when his youngest son, Bobbie, died, Sunday, March 3rd, 1940.

The youngster, he was only 11 months old, was such a lovable baby, and just learning to walk, too, that his death almost prostrated the father. This will explain the delay experienced in the filling of orders and the indulgence of our readers is further requested until Mr. Alessi is able once more to give his full attention to business.

Our heartfelt sympathy is extended to Mr. and Mrs. Alessi.

BIBLIOGRAPHICAL NOTES

Forty-Seventh Annual Report of the Ontario Department of Mines.

Part IV, 1938. Geology of the Keefer-Eldorado Area. By W. D. Harding and L. C. Berry. 26 pp., 7 illus., 5 sketch maps, 1 geol. map.

Part VIII, 1938. Geology of the South Onaman Area. By W. W. Moorhouse, 30 pp., 7 illus., 6 sketch maps, 1 geol. map.

Part IX, 1938. The Southwestern Part of the Schreiber Area. By G. A. Harcourt, pp. 1-28.

The Northeastern part of the Schreiber Area. By M. W. Bartley, pp. 29-40. 45 pp., 18 illus., 5 sketch maps, 1 geol. map.

Index Map of the Province of Ontario. No. 1939a. Showing areas covered by geological maps issued by the Ontario Department of Mines, accompanying Vols. 1 to XLVIII, Anual Reports 1891 to 1939.

The above interesting reports and map are issued by the Department of Mines, Toronto, Ont., Canada.

Ceratopsian Dinosaurs from the Two Medicine Formation, Upper Cretaceous of Montana. By Charles W. Gilmore.

Three expeditions for dinosaurian remains have been conducted by Mr. Gilmore to the locality, which is on the Blackfeet Indian Reservation in northern Montana. These explorations have resulted in the accumulation of considerable specimens which are described in this paper.

Issued by the Smithsonian Institution, Washington, D. C., 18 pp., 10 figs. (1939).

Jeweler's Stone Digest: A 16 page brochure listing and describing precious and semi-precious stones. It is a concise compilation to be used as a ready reference.

Catseye: A 6 page brochure consisting of a series of questions on the gem with answers.

Aquamarine: A 6 page brochure consisting of a series of questions on the gem with answers.

Opal: An 8 page brochure consisting of a series of questions on the gem with answers.

The above four brochures are issued by the Wm. V. Schmidt Co., Inc., *House of Stones*, 22 W. 48th St., New York, N. Y.

NEW YORK GEM DEALER DROWNS

Mineralogical circles in the East were deeply shocked by the sudden and tragic death of one of its most popular gem dealers, Stephen Varni of New York City. No one seems to konw how the accident happened but about 10:30 p. m., Friday, March 8th, 1940, a car was seen to make a wide turn in a parking lot near the Holland-American steamship. Nieuw Amsterdam, docked at Pier, 5, Hoboken, N. J., and then, without warning, crash through a guardrail to fall into the Hudson River, 30 feet deep.

New York harbor police, local officials and the Lackawanna Railroad, all working together, grappled for 7 hours before the submerged car could be raised from the river's bottom. A land derrick and a Lackawanna lighter crane after numerous failures finally succeeded in attaching a cable to the car, being aided by powerful searchlights from the liner many of whose crew and officers stayed up all night to watch the rescue work from the upper decks. At 5:30 a. m., Saturday, March 9th, the car was raised, with its sole occupant, Mr. Varni, still at the wheel. Dr. Richard Buckley, Assistant County Physician, released the body after declaring that death had been caused by accidental drowning.

Mr. Varni was President of the Stephen Varni Co., of 580-584 Fifth Ave., New York City, and was well known all over the country due to his many lectures and exhibits of gems. He was regarded as one of the foremost authorities on cultured pearls. He was a member of many mineral clubs.

Mr. Varni, who was 56 years of age, is survived by his wife, Sadie, to whom are very deep sympathy is extended.

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How to Collect Minerals. By Peter Zodac. A guide book for the collector, 80 pp., 15 ills., $1.00. Rocks and Minerals, Peekskill, N. Y.

Fifty Back Numbers of Rocks and Minerals Magazine, all in good condition and all different, $10.00. If you have back numbers send a list of them with your order and we will try not to duplicate any of them. Rocks and Minerals, Peekskill, N. Y.

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Choice Fossil Woods. Rare ancient types of Ferns, Palmwood, Cycads, Ginkgo, Conifers and Hardwoods. Write for information and prices. V. D. Hill, R7, Box 302-C, Salem, Oregon.

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Jade. New find, genuine, light green, translucent, waxy, Jadeite—the real thing. Write for information. V. D. Hill, R7, Box 302-C, Salem, Oregon.

Emerald Rough From Colombia, S. A., loose crystals $1.00 to $3.00. Specimens in matrix $2 to $15. Unusual formations for collectors from $1.00 up. Cut stones from $10 each up. Rough for practice cutting 20c a carat. Gem rough from $5 to $50 per carat. Selections sent on approval. Richard H. Van Esselstyn, 3 Maiden Lane, New York.

Montana Sapphires. Facet cut gems. Blue, Pink, Golden. Genuine. Write for prices. Also Black Fire Opals, Mexican Fire Opals, Zircons, Garnets and others. Write for list. V. D. Hill, R7, Box 302-C, Salem, Oregon.

Labradorite—Gem Quality, $2.00 per pound. Special price on fifty pound lots and over. John Vlismas, 244 East 77th St., New York City.

LAPIDARY SERVICE & SUPPLIES

Diamonds Saws Cut At Least Five Times Faster than any other type of saw. They use less power, are cleaner to operate and absolutely safe, and what is most important for per square inch of material cut, they are far cheaper. We are prepared to stand back of these statements. Eventually you will use one. Full directions for use with each saw. Free lessons and demonstrations given local purchasers. Priced 8" $5.50; 10" $6.50; 12" $7.50. Larger sizes on request. Wilfred C. Eyles, 794 W. A St., Hayward, Calif.

MINERALS

Garnets of gemmy quality for cutting. Deep red color, 15 for $1.00. F. L. Noy, Green's Farms, Conn.

Plume or Flower Agate. Famous rare finds. World's most beautiful agate. Only a few slabs left. Write for prices. V. D. Hill, R7, Box 302-C, Salem, Oregon.

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Collectors' Sample Parcel: Selection all varieties opal $5.00, $10.00. Lapidaries' Sample Parcel. Good assortment of cutting opal $5.00, $10.00. Black Opals: Partly polished from 50c each (small sizes). Cut from $1.00. Henbury Meteorites: About 1000 specimens, 1 oz. to 15 ozs., each 50c oz. Norman Seward, "Opal House", Melbourne, Australia.

Scott Rose Quartz Co.—Rose Quartz, Black Hills specimens, all kinds and colors; for rock gardens, cabinets, etc. Boxes: 24 specimens $1.00; 18 specimens, 50c; 15 specimens, 35c. Postage paid. Box 516, Custer, S. Dak. Send stamp for price list.

Oregon Agates, Jaspers, Petrified Woods. Beautiful polished slabs, many rare and scarce types, showy cabinet specimens. Reasonable prices. Send deposit of $1.25 for approval assortment. Price list free. V. D. Hill, R7, Box 302-C, Salem, Oregon.

Minerals, Fossils, Indian Relics, Books, Coins. Curios, Stamps, Old Glass. Catalogue 5c. Indian Museum, Osborne, Kansas.

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